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METALS

SECTION 05500

MISCELLANEOUS METALS

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SECTION 05500

MISCELLANEOUS METALS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45	(1980; R 1993) Designation System for Aluminum Finishes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A14.3	(1992) Ladders - Fixed - Safety Requirements

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1991) Structural Steel
ASTM A 53	(1996) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 283	(1993a) Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 307	(1992a) Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A 320	(1992) Alloy Steel Bolting Materials for Low-Temperature Service
ASTM A 467	(1993) Machine and Coil Chain
ASTM A 475	(1995) Zinc-Coated Steel Wire Strand
ASTM A 500	(1996) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 501	(1996) Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 513	(1991a) Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing

ASTM A 653	(1996) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924	(1996a) Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 26	(1996a) Aluminum-Alloy Sand Castings
ASTM B 32	(1993) Solder Metal
ASTM B 221	(1996) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
ASTM B 429	(1995) Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM D 2047	(1993) Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
ASTM F 1267	(1991) Metal, Expanded, Steel

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (1995)	Minimum Design Loads for Buildings and Other Structures

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.3	(1985) Malleable Iron Threaded Fittings Classes 150 and 300
ASME B18.2.1	(1981; R 1992) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987) Square and Hex Nuts (Inch Series)
ASME B18.22.1	(1965; R 1990) Plain Washers

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1992) Structural Welding Code - Steel

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-344	(Rev B) Lacquer, Clear Gloss, Exterior, Interior

FEDERAL SPECIFICATIONS (FS)

FS FF-S-325	(Basic; Int Am 3; Notice 1) Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)
FS RR-C-271	(Rev D) Chains and Attachments, Welded and Weldless
FS VV-G-632	(Rev A; Am 1) Grease, Industrial, General Purpose

"GREEN BOOK" STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

SECTION 210-3	(1997; 1998 Supplement) Galvanizing
SECTION 206	(1997; 1998 Supplement) Miscellaneous Metal Items
SECTION 310	(1997; 1998 Supplement) Painting

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MBG 531	(1988; MBG 531S-89) Metal Bar Grating Manual
NAAMM MBG 532	(1988) Heavy Duty Metal Bar Grating Manual

1.2 GENERAL

1.2.1 Submittals

The following shall be submitted in accordance with SECTION 1330: SUBMITTAL PROCEDURES.

1.2.1.1 Shop Drawings; GA.

Complete shop drawings for fabrication of the safety railing, T-skate, and ornamental fence panels and gates, posts, gate hinges, gate stops, and gate bollards shall indicate complete layout of the work based on field measurements, and shall clearly indicate all deviations from the plans, widths of gate openings, and direction of swing or travel. Shop Drawings for ornamental fencing shall not be copies of details on the plans, but shall be supplemental drawings indicating methods of fabrication and installation; hardware such as latches, rollers, hinges, etc.; and material list.

1.2.1.2 SD-13 Certificates; GA.

Certificates of compliance of material to the specification shall be furnished by the Contractor.

1.2.1.3 Paint System Reports

Contractor shall submit 5 copies of manufacturer’s literature for the paint system proposed.

1.2.2 Welding

Welding shall conform to the provisions of AWS D1.1. Welders who have not been certified within 2 years of the date of commencement of work under this contract will not be allowed to perform the work.

1.2.3 Bolt Holes

Bolt holes shall be reamed or drilled normal to the member. Cutting bolt holes with a torch will not be permitted without the prior written approval of the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases where materials are not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products.

2.1.2 Steel Pipe

Steel pipe shall be zinc-coated (galvanized) steel pipe conforming to the requirements of ASTM A 53, Standard Weight, Schedule 40.

2.1.3 Steel Shapes and Plates

2.1.3.1 Steel bars, angles, and plates shall conform to ASTM A 36. Galvanized coating, where required, shall conform to ASTM A 123.

2.1.3.2 Steel tubing shall conform to ASTM A 500, Grade A for posts, and ASTM A 513 for pickets and rails.

2.1.3.3 Steel tubing materials shall be of hot rolled mild steel conforming to ASTM A-501, size and wall thickness as noted on drawings, minimum 11 gauge wall thickness.

2.1.4 Concrete, Mortar and Grout

Concrete, mortar and grout shall conform to the requirements of SECTION: CAST-IN-PLACE STRUCTURAL CONCRETE.

2.1.5 Formwork

Formwork shall conform to SECTION: FORMWORK FOR CONCRETE.

2.1.6 Chain

Chain shall be galvanized and shall conform to the requirements of FS RR-C-271, Type 1, Grade C, Class 4. The chain shall be attached with a galvanized connecting link and shall accommodate a 5/16-inch diameter padlock shackle.

2.1.7 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall be of the material, grade, type, class, style and finish indicated or best suited for intended use.

2.1.7.1 Bolts and nuts shall be ASTM A 307, Grade A, hot-dip galvanized or ASTM A 320.

2.1.7.2 Bolts shall be ASME B18.2.1.

2.1.7.3 Nuts shall be ASME B18.2.2.

2.1.7.4 Plain washers shall be ASME B18.22.1, Type B.

2.1.8 Expansion Bolts

Expansion bolts shall be galvanized and shall conform to FS FF-S-325.

2.1.9 Pipe Caps

Pipe caps shall conform to ASME B16.3.

2.1.10 Safety Railing

Safety railing shall be designed to resist a concentrated load of 200 pounds in any direction at any point of the top of the rail or 20 pounds per foot applied horizontally to top of the rail, whichever is more severe.

2.1.10.1 Steel Safety Railing, Including Carbon Steel Inserts

Steel safety railing, including inserts in concrete, shall be steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel railings shall be 2 inch nominal size. Railings shall be hot-dip galvanized. Pipe collars shall be hot-dip galvanized steel.

a. Joint posts, rail, and corners shall be fabricated by one of the following methods:

(1) Flush type rail fittings of commercial standard, welded and ground smooth with railing splice locks secured with 3/8 inch hexagonal recessed-head setscrews.

(2) Mitered and welded joints by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be butted and reinforced by a tight fitting interior sleeve not less than 6 inches long.

(3) Railings may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and the pipe is not crushed. b. Removable sections, toe-boards, and brackets shall be provided as indicated.

2.1.11 Ladders

Ladders shall be galvanized steel or aluminum, fixed rail type in accordance with ANSI A14.3.

2.2 FABRICATION

2.2.1 Ornamental Fence Panels

Pickets shall be galvanized steel tubing with caps welded at the top of the pickets. Pickets, rails, and brackets shall be finished to provide smooth, straight edges free of burrs. All surfaces of the fence panels and brackets shall

be cleaned in the shop to remove all rust, scale, dirt, and other foreign matter. “Tight” mill scale that cannot be lifted by applying a sharp knife to any edge will be permitted. The cleaning shall be accomplished by scraping, wire brushing, and wiping or other approved methods. Any damage of the picket fence panels during transportation and/or installation will be cause for rejection of the fence panels.

2.2.2 Gratings and Frames

Steel gratings shall be manufactured in accordance with the NAAMM MBG 531 for bar-type gratings. Edges shall be banded with bars 1/4 inch less in height than bearing bars for grating sizes above 3/4 inch. Banding bars shall be flush with the top of bearing bars. Frames shall be of welded steel construction finished to match the grating. Gratings and frames shall be galvanized after fabrication.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 General

3.1.1.1 Ornamental Fence

All fence posts, bollards, gate posts, and pickets shall be installed plumb. Fence posts shall be installed to provide a straight and even alignment. Fence panels shall be installed level and in a straight alignment from one side of the post to the other. All bolts and nuts shall be tight. Expansion anchors shall be snug and shall not permit movement when tested by hand. Surfaces of galvanized metals that are abraded, cut, or welded during installation shall be neatly covered with grade 50B solder conforming to ASTM B 32. The installed fencing shall be pretreated and receive one coat (3 mils) and two coats (3 mils) of flat black epoxy enamel.

3.1.2 Excavation for Concrete-Embedded Items

Excavation for concrete-embedded items shall be of the dimensions indicated on the drawings. Holes shall be cleared of loose materials prior to placement of concrete.

3.1.3 Non-Shrink Grout

The Contractor shall use non-shrink grout conforming to the requirements of SECTION: CAST-IN-PLACE STRUCTURAL CONCRETE to fill the voids under and above the base plates for fence posts.

3.1.4 Gate Hinge Greasing

The Contractor shall grease gate hinges thoroughly with grease conforming to FS VV-G-632 immediately after installation of gate leaves. The gates shall be installed in such a fashion that they work freely. The Contractor shall examine the operation of all gates not sooner than 30 days after installation for ease of operation. Any gates that cannot be operated by one person will be repaired (including any required structural modifications) by the Contractor at no

additional cost to the Government, and requirements for repair shall conform to the requirements for installation above.

3.2 ATTACHMENT OF SAFETY RAILING

Toeboards and brackets shall be installed where indicated. Splices, where required, shall be made at expansion joints. Removable sections shall be installed as indicated.

3.2.1 Installation of Steel Safety Railings

Installation shall be in pipe sleeves embedded in concrete and filled with molten lead or sulphur with anchorage covered with standard pipe collar pinned to post. Rail ends shall be secured by steel pipe flanges.

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